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EDITED BY WATSON DAVIS

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EDWIN E. SLOSSON, Director
WATSON DAVIS, Managing Editor

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Chat on Science

SPUN LOGS

By Dr.Edwin E. Slosson

Science consists in learning from nature how to surpass nature. The chemist in particular is never content till he can do something that his teacher can't. In the field of fabrics he has made dyes more brilliant than any to be found in the three kingdoms of nature, animal, vegetable and mineral, and now he is inventing new textiles to tint with them. He beat the indigo plant on its own ground, and carried off the blue ribbon. He challenged a snail to a race, the Mediterranean mollusk that produced the "royal purple" of the ancients, and beat him, for now the chemist is making a better dye out of coal tar and making it so cheap that anybody can afford it.

Now the chemist is engaged in another competition. His rival this time is a worm. He has challenged the champion spinner of the world, one who has, for over four thousand years, held the prize for the finest and most flossy fiber, the silk worm. The worm chews up mulberry leaves and spins out through his mouth a silk thread five hundred yards long. Thechemist grinds up logs of wood and spins out by means of his mechanical spinnerets a silky thread as long as he likes, for the machines run day and night and all the week long, throughout the year. And the thread the chemist makes is more uniform in size and substance, for the worm, although he was practising the spinning art thousands of years before man appeared upon the earth, has never yet learned how to produce a perfectly smooth and even filament.

Not long ago I had a chance to inspect a rayon plant and it was fascinating to watch the process. At one end of the factory spruce logs are floated in. At the other end skeins of glossy yarn are being shipped out. The wood pulp costs about five cents a pound and the synthetic silk sells for two dollars a pound, and more than that when you buy it in the form of neckties, shirts, sweaters and stockings.

And you buy it oftener than you think you do even if you prefer to patronize worms rather than men. For nearly two-thirds of what seems to you silk comes nowadays from chemistry instead of the cocoon.

The dictionary is a heavy and clumsy volume and cannot keep up with the swift advance of science. That is why there is no common name yet for the thing that I am talking about, these synthetic fibers made from cellulose, although they have in the last ten years come into such common use. They are often called "artificial silk", or, what is worse, "imitation silk", although they are not the same as

silk and should never pretend to be. Last year most of the manufacturers agreed to adopt, and introduce through advertising, a new name, "rayon" for all products of this sort, but some of the makers refuse to accept this general term and stick to their own trade names.

Although all of the four present processes of making synthetic silk were first developed in Europe, the United States now leads to world in its production and consumption. In the field of science we Americans do not distinguish ourselves on the kick-off but we beat the world in keeping the ball going when once it is put in play. The world's output of these artificial cellulose products for the present year is estimated at about 185,000,000 pounds, and American manufacturers made nearly a third of the total. We may reasonably expect that next year, the United States will turn out 74,000,000 pounds, which will mean a 600 per cent. increase in the last five years.

GOVERNMENTS AND RELIGIOUS BODIES DIFFER ON CALENDAR REFORM

Calendar reform, urged by numerous scientific organizations in various parts of the world, is "laid on the table for an indefinite time, but by no means rejected" as a result of the expressions of opinions of various governments and religious organizations, says Rev. William F. Riggs, S. J., professor of astronomy at Creighton University , in "Popular Astronomy". Revision of our yearly time table has been under consideration by the League of Nations for several years, he points out. The questions particularly considered were whether or not the date of Easter should be definitely fixed, and whether the calendar should be adjusted so that the days of the year will always fall on the same days of the week.

Various plans for securing such a condition and involving more or less radical changes in the Gregorian calendar, now in common use, have been proposed, and the committee of the League of Nations asked an expression of opinion from all the governments of the world, and from 18 religious organizations, including the Roman Catholic Church, the Greek Catholic Church, the Church of England, the Jewish Associations in Paris and London, the Evangelical Church in Berlin, the Christian Science Church in Boston, and the Confucius Society in Peking.

More than eighty communications were sent in as a result, and, as might be expected, they showed great diversity of opinion. "The official pronouncements," says Father Rigge, "were very reserved and even evasive. Not a single church or government expressed any desire for reform, two or three even opposed it. The Jews appealed to their holy books and declared that their Sabbath could not be touched."

The Church of England and the Greek Catholic Church answered that they did not oppose a change in the ecclesiastical feasts, if uniformity was attained. The Vatican stated that it was unable to see any need for such changes from the traditional practice, but that if it could be shown that such a departure was for the public good, it would consider the matter, after the previous decree of an Ecumenical Council. The British Government declined to commit itself, but expressed a willingness to consider recommendations if backed by public opinion.

One of the proposals, recommended by banks and bureaus of commerce, is the addition of a "blank day" to the calendar, which will not be a part of any week

or month. By such a means, the year would have only 364 ordinary days, which could be divided into 12 months with eight of thirty days and four of thirty-one. By making this "blank day" a special holy day, it is suggested that the religious scruples of the Jews and others who believe in keeping the "seventh day" holy, might be satisfied.

RADIO MESSAGES BY PICTURE WITHIN YEAR, SAYS HARBORD

"The fac-simile radiogram commercially available within a year," is the promise of radio, according to Maj. Gen. James G. Harbord, president of the Radio Corporation of America, addressing a conference on education and industry at the University of Chicago. "This is the fruit of long research work done in radio photograms." said Gen. Harbord. "The received copy is a fac-simile of the original, and its accuracy will be beyond question. The speed at which this work is being done promises commercial value before the return of the next summer's static."

The problem of communication with Europe, Gen Harbord predicted, would all be solved in the near future. He mentioned the question of wavelength with regard to international communication. "The wave length," he said, "is a species of property. Losses in money and prestige would follow the deprivation of a particular wave length to which right had been established by actual use. These matters will have to be considered at an international conference, a form of calamity which has not yet afflicted the radio field, but is constantly threatening. An international conference cannot be much longer delayed."

Gen Harbord painted a brilliant future for radio. He said in part:

"It is not given to mortal man to read the future of an art with such undreamed possibilities. That is will grow to be one of the towering industries of our country may be safely ventured as a prophecy. In international communication I can visualize a world even more completely linked together. Every part of the world is destined to benefit by improved communications. Entire written messages perhaps newspapers, will be flashed as complete pictures or documents. Efficient communication with commercial aircraft will be ready probably before the aircraftsare provided. Marine service to and from and between ships will even more completely minimize the perils of the deep. Television is not far distant. Static will be chained a captive at the wheels of radio progress. International broadcasting will become a commonplace. The operas of Europe will compete with our own. The incomparable music of the countries to the south of ours will be heard in American homes. Entertainment and instruction will penetrate to the remotest corners of the earth. In time of national crises or great emergency, Presidents will appeal to our millions in tones of voice that will be recognized. The temple bells of Asia will chime forus , and from the land of old religions will come the philosophies of ancient races. The oldest and newest civilizations will throb together at the same intellectual appeal and to the same artistic emotions.

Bananas ripen best in dark roomskept at a temperature of about 70 degrees Fahrenheit, and with 85 to 90 per cent. humidity.

TICK JUICE PROTECTS AGAINST ROCKY MOUNTAIN SPOTTED FEVER

A vaccine has been made from the ground bodies of disease-carrying cattle ticks that gives immunity to Rocky Mountain spotted fever, transmitted by the same parasites. Dr. R. R. Spencer and R. R. Parker of the U.S. Public Health Service have successfully vaccinated rabbits, guinea pigs, monkeys and human beings against this much dreaded fatal infection of the western cattle range. Up to the present time 34 persons have been vaccinated against the infection and none of these has succumbed to the disease.

"We see no reasonwhy injection may not be repeated each spring," said Dr. Spencer, "in persons whose occupations definitely expose them to infection. It would be impracticable to vaccinate the general population of the spotted fever region, but it is believed the vaccine would afford a protection to those exposed." This would include, residents, vacationists, labotatory and field workers, foresters, lumbermen, sheep herders, surveyors, hunters, prospectors and fishermen in the badly infected area.

The vaccine must be prepared from the infected ticks at the time when the virulence of the parasitic organisms that cause the disease is at its height. This is when the tick is in the adult stage. But the potent virus cannot be obtained from the tick at the time of infection, for the organismsneed an earlier start.

The experimenters brought up healthy adult ticks and placed fertilized females in pill box wards, where they laid eggs. The eggs hatched to larvae and these were given a square meal off an infected rabbit. The larvae were nursed through the numph stage and molted into adult ticks. These ticks were given a three months' rest and were well fed. Then they were eviscerated and ground up with sterile sand and salt water.

The liquid thus obtained was sterilized by means of carbolic acid, and used as vaccine. Guinea pigs treated with this serum were immune to the disease for eight months, which was as far as the tests extended. Vaccinated monkeys remained immune and others that had not been treated died.

A cattle dipper in the affected area had been vaccinated before he was bitten by infected ticks that he picked off by hand off of the cattle. He developed a mild form of the disease but was never in danger. He recovered completely while four other persons infected died within ten days.

The truth of the saying that "it's not the heat but the humidity" has been demonstrated by recent experiments which show that when the air contains all the moisture it can hold, the human body cannot endure a temperatyre of over 90 degrees Fahrenheit for more than a short time.

The largest topographic map in the world is a relief map of California, 600 feel long and 12 geet wide, now on exhibit in San Francisco.

HIGH BLOOD PRESSURES REDUCED BY LIGHT

The problem of high blood pressure has had light thrown on it in a most literal way by the experiments of Prof. C. J. Reed of Baylor University. If the results he has obtained with animals can be extended to apply to human beings, it may mean that this great curse of middle age will be lifted by nothing more difficult than scientifically applied sunbaths.

Prof. Reed began his experiments by shining powerful lights directly into the eyes of anesthetized animals, so that the beams would fall on the thick network of minute blood vessels lining them. The arterial blood pressure fell off rapidly in a short time, in some cases as much as 80 per cent. Then he repeated his experiment, this time throwing the light on the lining of the mouth, which is also rich in small blood vessels. Here also he obtained marked diminution of blood pressure. In both cases auxiliary experiments showed that no explanation could be found in theories of nervous effects of the light, or of chemical changes in the tissues caused by it.

As a final test, Dr. Reed placed his animals under anesthetics, severed arteries in their throats, and into the cut ends inserted quartz tubes, so that these tubes became a part of the animals' circulatory systems. Then he directed the light on the blood as it flowed through the tubes, and once more the marked lowering of the pressure was noted.

In none of the experiments, Dr. Reed stated, could the effects be traced to any special part of the light spectrum. In some of the tests he filtered out both the infra-red and the ultra-violet rays, and in others he used all the radiation from his arc lamps ; but in all cases his results were the same.

CHANGES IN OCEAN DEPTHS PUZZLE NAVY OFFICIALS

Vessels of the U.S. Navy will soon be employed in an effort to locate a reported shoal extending southeast from Cape Hatteras, and reported recently by a merchant vessel, the "West Selene", says Capt. W. S. Crosley, chief hydrographer of the navy. This boat was forced towards shore in foggy weather and made sounding to avoid getting too close to the beach, but they found depths of only 300 feet where the navy department's charts showed three times as much.

Apparently the report is correct, said Capt. Crosley, but alterations are not to be made on the charts until the changes have been officially verified. For this reason soundings by naval vessels in this region will soon be made. If the shoal is found, it will be most remarkable, he said, because it is certain that it was not there at the time the soundings on which the charts are based were made. The hydrographic office has no record of any such changes in the ocean bottom on any part of the Atlantic Coast.

Changes have been found in other parts of the world, however, the hydrographer continued, especially around Japan. They followed the great earthquake of 1923, and the Japanese navy is now engaged in an extensive survey to determine the extent of these changes. Similar changes in the Bay of Biscay, where, at a supposed depth of 24,000 feet, a depth of only 120 feet was reported, have not been verified. Soundings over this region have been made by a French naval vessel, the "Loriet", and

they found nothing abnormal.

Capt. Crosley suggests that such reports might arise when a lead is used for soundings, as the line may become fouled before the weight reaches the bottom. The sonic depth finder is not subject to this source of error, and American naval vessels are now being regularly equipped with them. During the recent Pacific cruise of the fleet an extensive series of sourdings was made, which the hydrographic office is now engaged in tabulating. This is expected to be especially valuable, as the only soundings now available of much of this area are those made when cables were laid to Alaska and to Guam.

PICTURES BY TELEPHONE FIND WIDE USE

How the method of transmitting photographs by telephone lines has been developed into a regular commercial service, by which either a photographic negative or positive may be sent regardless of the character of the original, was described to the members of the Optical Society of America by Dr. Herbert E. Ives, who has been largely instrumental in making the method a success. Dr. Ives is now retiring as president of the society, and he spoke on the subject in his presidential address at the annual meeting in Ithaca.

"One is apt to imagine," said Dr. Ives, "that when photographs are sent by wire, the apparatus might be looked upon merely asa long distance photographic printing frame and that its functionwould be simply to take the negative from the camera at the sending end and make a print at the receiving stationsome hundreds or thousands of miles away. The problem, however, is not quite so simple as this. In ordinary photography, the man who makes the print has the negative in his hand to look at, and he can decide how it should be handled. He is apt to make several trials before he gets it right, but this is not possible in sending photographs over wires because of the cost of the line time. This cost is similar to that for telephoning for the same time, several minutes, and so it is the ideal to have conditions so standardized that the telephone line can be used exactly as it is set up for the transmission of the voice."

But this is not the only way that telephonic transmission of pictures differs from ordinary photography, said Dr. Ives, for it opens up new possibilities ."Thus it is possible", he said, "by adjusting partsof the apparatus, for a picture to be received as a positive or a negative, no matter which form the original may have. It is also possible to make the picture transmitting apparatus produce the received picture with a structure of dots which may be directly used inMaking the zinc printing plates for use in the newspapers. Altogether, there are at least eight different ways in which a photograph might be handled in sending from one point to another."

As the chief justification for sending photographs by this method is the need for speed, the apparatus has been designed from the start to work with as few operations as possible. For instance, he said, the original picture may have been taken on a film or plate of any size, and so it is always necessary to make a photographic copy of it before it can be sent. Therefore, the machine is so constructed that the transparency films may be used while they are still wet, and it is not necessary to wait for them to dry.

At present, a regular service for anybody who wishes to use it is maintained between Chicago, New York and San Francisco. Where only one print is required it is usually received directly on paper as a print, but when it is done for a news agency, said Dr. Ives, it is preferable to receive a negative from which any number of prints may be made.

VENUS AND JUPITER COMING TOGETHER

By James Stokley

The planets that ornamented the evening sky a few months ago are now gradually vanishing, to reappear in the morning before sunrise, but Venus and Jupiter are still with us after sunset, and will remain so for all of November. Ordinarily, it is hard to realize that the planets are moving with regard to the stars, and to each other, so slight is the change from one night to the next, but if you watch Venus and Jupiter during the next few weeks, you will no longer doubt their motion.

If it is clear this evening, look to the southwestern sky, and you will see these two planets. The one farther west is Venus; it is also the brighter, while Jupiter, not greatly deficient in brilliance, shines to the left. Now there is a considerable distance between them, but if you watch them until the end of the month, you will see Jupiter approach nearer Venus, and finally, onthe 26th, they will pass. After that Venus will be higher in the sky. It will set later each night until the 28th, when it will be at greatest eastern elongation, that is, its greatest distance east of the sun. Then it will begin to move the other way, and each evening it will be seen a little more to the west of its position the previous night, but it will not travel fast enough to overtake Jupiter until next February.

In the meantime, another planet will enter into this celestial race. Mercury, whose orbit lies nearer the sun than any other planet, will be at its greatest distance east of the sun, as we see it, on the twenty-second, and then, or a few days before or after, if you look low in the western sky just after sunset, you will see this orb, which, it is said, even the great Copernicus was never able to observe.

EVOLUTION STILL TAUGHT IN SCHOOLS OF TEXAS

Despite the elimination of certain passages from the textbooks used in Texas schools by the state text book commission, the doctrine of evolution has not been banished from the schools of that state, according to an investigation made by Science Service's Austin correspondent.

There is no law in Texas against the teaching of evolution, the investigation revealed, and it is probable that if an effort to pass such an act is made during the coming session of the legislature it will not be successful. The state text book commission simply revised certain paragraphs dealing with evolution in two state-adopted books used in elementary and high schools, because they felt that the wording of the particular passages was needlessly irritating to the many persons who do not agree with present-day teaching on the subject.

In any case, colleges and universities are not affected by the action of the commission. So far as can be ascertained, all scientists in Texas colleges and universities teach the theory of evolution, and would regard any interference with freedom to teach the truth as they know it as a fatal tragedy for education.

AIRPLANE HELICOPTER HYBRID CALLED IMPORTANT AIR INVENTION

"The most important step in aeronautical progress since the Wright brothers flew the first airplane." This is the way in which Vice-Marshall Sir Sefton Brancker of the British Air Ministry described the interesting combination of airplane and helicopter, the autogiro, invented by Juan de la Cierva, Spanish civil engineer, which has had trials at Farnborough recently.

It has been announced that as a result of these tests several machines with modifications will be built for the air ministry.

The autogiro is an airplane that has had its wings clipped, as it were, and it has a second propeller on a vertical axis above the fuselage which exerts a force downward tending to keep the craft from falling. This vertically mounted propeller is similar in shape to the conventional propeller with which an airplane is equipped but it has a diameter equal nearly to the wing spread of the craft itself.

When the air-screw on vertical axis is started with sufficient power to give 120 revolutions per minute, the autogiro leaves the ground with the very low ground speed of fifteen miles an hour, according to measurements made during the Farnborough tests.

The Autogiro invented by Senor de la Cierva and recently tested in England is an invention first tested in October, 1920, just five years ago.

Although leading aeronautical experts connected with the American government do not share the reported optimism of the British authorities as to the importance of the autogiro, yet its development has been looked upon with interest.

Three years of experiments were necessary on the part of the Spanish inventor and his associates before a successful and satisfactory autogiro was developed.

To understand the principle of operation of the autogiro, it is necessary to know that the ordinary airplane in order to be maintained in the air must have a high velocity. The lift or pressure upward that sustains the airplane in the air decreases much faster than the decrease in speed of the airplane and therefore a small loss in velocity of the airplane may result in a catastrophe.

In the autogiro, however, the sustaining lift is produced by revolving wings on a vertical shaft projecting from the fuselage of an ordinary airplane. However although it may look like a helicopter, it does not really belong to that family since the sustaining propellers of the helicopter are operated directly by the engine, whereas in the autogiro the wind produced by the motion of theaircraft actuates the blades. If the craft had not been christened autogrio, it might be called an "airplane with revolving wings."

It is claimed that the autogiro is not affected materially by loss of speed. If there is an engine failure, a sudden "nose up" or a very sharp turn, the horizontal flight of the craft may be interrupted and it may be forced toward the ground, but the sustaining blades will sustain it in the air and enable it to alight at a very low speed. The stalling of the engine while in flight over tough ground, which would be fatal to an ordinary airplane, would be a mishap of minor importance to an autogiro. On the other hand, it is admitted that the autogiro will probably be unable to do any looping or other stunts such as are performed fighting airplanes.

NEW DIABETES REMEDY MAY REPLACE INSULIN

Insulin, Dr. F. G. Banting's world famous remedy for diabetes, the discovery of which won him a Nobel Prize, may be superseded within a few years in all but the most serious cases of the disease.

A nother Canadian research worker, Dr. J. M. Rabinowitch, has prepared a substitute for it, which has the great advantage that it can be taken by the mouth. Insulin is administered by injections.

The substance which has been prepared by Dr. Rabinowitch is a sweet syrup, analogous to sugar, which is obtained from glycerin on which a certain bacterium has been allowed to act. It is known as dioxyacetone.

Dr. Rabinowitch, assisted by Miss A. B. Frith and Miss E. V. Bazin, gave dioxyacetone by the mouth to sufferers from diabetes in the Montreal General Hospital. It was found to have an admirable effect in lowering the blood sugar. It is expected to act as a perfectly efficient substitute for insulin in the future in most cases of diabetes where the disease has not advanced too far, so that in very many instances it will not be necessary to have reccurse to the injections.

Dr. Rabinowitch is at present preparing a detailed record of the cases in which dioxyacetone has been used remedially.

TIBETANS FEAR TOBACCO MAY SMOKE OUT LAMAS

Dire consequences are feared in Tibet if tobacco is introduced into that hermit kingdom, it is revealed in a copy of an official letter of the Tibetan Government declining to permit the introduction of cigarettes by a British tobacco firm, which has been received at the U.S. National Museum in Washington.

The letter says in part: "The country of Tibet is a holy religious kingdom and in this country there reside many Gods and Lamas and protecting Gods. By smoking cigarettes they will disappear like the clouds and misfortune will arise and the bad smell which will spread everywhere will affect men and animals, causing sickness, death, and disease to all, and also the loss of fortune and wealth of the people. Therefore we want to be saved from this and to study the benefit of all. The Tibetan Government does not allow the smoking of cigarettes in Tibet to anybody. We have informed the Indian Government of this at the same time. Though levying a tax on cigarettes in Tibet would be very good to make profits, yet it would cause great harm and sickness to Tibet as well as bad fortune."

The letter is signed "By the collected Ministers of the Tibetan Government
In the Wood-Ox year, the first month, the 22nd day."

The United States now consumes more platinum than all the other countries of the world together.

TABLOID BOOK REVIEW

EVOLUTION AND CHRISTIANITY. By William M. Goldsmith. Haldeman-Julius Company, Girard, Kansas. 1925

Of the making of evolution books for popular reading there is no end, now that repressive legislation has made the subject a widely discussed and therefore a profitable one. But in this rather over-written field Professor Goldsmith's book occupies a unique and very useful position. For instead of merely satisfying himself with a dignified and more or less non-technical statement of the evidence for evolution, as most of the popular books do, he goes after the anti-evolution forces and presents a mass of material in rebuttal that must have cost a lot of time and labor to collect. He knows all the more noisy of the assailants of biology; he knows also their style of fence, shows the parries proper for their thrusts, and strikes at the weak places in their armor with considerable effect. Doctor Goldsmith shows himself one of the best fighters in the field of rough-and-tumble controversy over the evolution question, and his book should have a place in the library of every one interested in science.

PROTEUS, or The Future of Intelligence. By Vernon Lee. New York, E. P. Dutton and Company. $1.00.

The latest edition to the Today and Tomorrow series of Greek-entitled speculations on the future has all the whimsical lightness of touch which distinguished the Daedalus of J.B.S. Haldane, the Icarus of Bertrand Russell, and most of the other volumes of this fascinating series. But it is somehow less interesting, perhaps because the artistry of style is carried to the pitch of self-conscious artifice, perhaps because there is so little solid matter beneath the play of wit. The whole book is simply an encomium on Intelligence, considered in a narrow sense as a sceptical readiness of wit. The key sentence of the book seems to be: "From the misapplication of our Science, the exaggerations and lunacies of our Genius, and the havoc wrought by our higher instincts, we therefore need to be saved, not by Reason, which is always too long in getting under way, but by Intelligence, active, alacritous and ubiquitous, afraid neither of being laughed at nor of laughing at others".

NEW MINERAL DEPOSITS FOUND IN SIBERIA

Rich veins of radium, gold, and other rare metals have been discovered in the Ekimchansky region of the Amur province, Siberia. A telephone line has already been constructed, cooperatives organized, and general signs of life are present in this formerly desolate region.

New deposits of phosphates were recently found in fourteen different localities of the government of Voronesh. The total area of these localitities covers about 140 square miles and the deposits are estimated at 125,000 tons.